FIELD SAMPLING PLAN
NORTH CHICAGO REFINERS AND SMELTERS (R. LAVIN) SITE
NORTH CHICAGO, LAKE COUNTY, ILLINOIS

Prepared for
U.S. Environmental Protection Agency
Region 5 Emergency Response Branch
77 West Jackson Boulevard
Chicago, Illinois 60604

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ABBREVIATIONS AND ACRONYMS

µg/L	Microgram per Liter
AOC	Area of concern
AOI	Area of interest
CGI	Combustible gas indicator
DOT	U.S. Department of Transportation
FSP	Field sampling plan
HNO_3	Nitric acid
IDW	Investigation-derived waste
MS/MSD	Matrix spike/matrix spike duplicate
OSC	On-Scene Coordinator
PID	Photoionization detector
PPE	Personal protective equipment
QA	Quality assurance
QC	Quality control
RCRA	Resource Conservation and Recovery Act
SOP	Standard operating procedure
START	Superfund Technical Assessment and Response Team
Tetra Tech	Tetra Tech EM Inc.
U.S. EPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

The Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) prepared this field sampling plan (FSP) for the North Chicago Refiners and Smelters (R. Lavin) site in North Chicago, Lake County, Illinois under U.S. Environmental Protection Agency (U.S. EPA) Contract No. 68-W-00-129, Technical Direction Document No. S05-0205-004. This FSP describes multimedia sampling activities to be conducted during the field sampling. The FSP was developed based on site information provided by the U.S. EPA On-Scene Coordinator (OSC).

The FSP consists of the following nine sections:

- Section 1.0 - Introduction
- Section 2.0 - Site Description and Background
- Section 3.0 - Project Summary
- Section 4.0 - Field Sampling Activities
- Section 5.0 - Decontamination Procedures
- Section 6.0 - Disposal of Investigation-Derived Waste (IDW)
- Section 7.0 - Sample Analytical Parameters
- Section 8.0 - Quality Assurance (QA)/Quality Control (QC) Procedures
- Section 9.0 - Reporting Requirements

References used to prepare this FSP are listed after Section 9.0. Appendix A to this FSP contains applicable Tetra Tech standard operating procedures (SOP) to be followed during field sampling activities.

2.0 SITE DESCRIPTION AND BACKGROUND

This section briefly describes the R. Lavin site and provides site background information.

2.1 SITE LOCATION AND DESCRIPTION

The R. Lavin site is located at 2028 North Sheridan Road in North Chicago, Lake County, Illinois. It is unknown at this time what borders the site.

The R. Lavin site consists of three aboveground storage tanks (AST), two retention ditches, slage stockpiles, numerous baghouses, and a process pumping station. Miscellaneous debris and 55-gallon drums are also located on site.

2.2 SITE BACKGROUND

At this time, a limited site history exists for the R. Lavin site. The site is bankrupt; however, the date of bankruptcy is unknown at this time. Site owners would like to auction off the ASTs; however, all three ASTs are between 50 to 80 percent full and contain process waters. The ASTs have been sampled before by a private environmental firm; however, the results are not available at the time of this FSP. Contaminants of concern include the following metals: cadmium; chromium; beryllium; boron; copper; lead; nickel; and zinc. Additional information about the site will be gathered during the site reconnaissance. manganese;

2.3 AREAS OF INTEREST

The AOIs for the field sampling were identified based on information provided by the U.S. EPA OSC. This section discusses the site AOIs with reference to the general sampling locations that are targeted for the field investigation.

Aboveground Storage Tanks. Three ASTs are located at the R. Lavin site. Two of the ASTs have a capacity of 350,000-gallons; the third tank has a capacity of 2 million gallons. All three ASTs contain process waters produced from furnaces located on site. The two 350,000-gallon ASTs are approximately 50 percent full and have a layer of sludge on the bottom. The depth of the sludge is unknown at this time. The 2-million-gallon capacity AST is approximately 80 to 85 percent full; no sludge is thought to be located on the bottom of this AST. The process water contained in the ASTs is thought to be high in metal content.

Retention Ditches. Two retention ditches are located at the R. Lavin site. Both surface water and sediment contamination are suspected for these AOIs.

Slage Stock Piles. Two piles of slage are located on site. A composite sample will be collected from both stock piles.

Baghouses. Numerous baghouses are located on site. Samples will be collected only an easy route of access is available.

Process Pumping Station. A process water pumping station is located on site. The station contains a pit which contains process water.

An inventory of wastes observed at the site will also be conducted by START. If material is discovered that warrants a possible hazard, additional areas may be sampled.

3.0 PROJECT SUMMARY

This section summarizes the project's objective, scope of work, and tentative schedule.

3.1 OBJECTIVE

The objective of the field sampling at the R. Lavin site is to identify materials at the site that could pose a threat to the community and residents. In addition, it is the objective of the field sampling at the R. Lavin site to estimate the volume of wastes, by type, present at site.

3.2 SCOPE OF WORK

The scope of work for the project consists of those tasks necessary to achieve the objective described in Section 3.1. This objective will be accomplished by collecting samples from various media at the AOIs described in Section 2.3; collecting various samples from other miscellaneous areas identified at the site during the reconnaissance; and conducting an inventory of wastes at the site. Sections 4.0 through 8.0 of this FSP provide specific details.

3.3 TENTATIVE SCHEDULE

The table below presents a tentative schedule for the project.

TENTATIVE PROJECT SCHEDULE

Activity	Tentative Due Date
Site setup and initial site walkthrough to identify all sampling locations	15 May 02
Conduct sampling activities	15 May 02
Conduct inventory of wastes	15 May 02
Receive verbal analytical results	23 May 02
Receive hard copy analytical results	30 May 02
Submit report with validated analytical results to U.S. EPA OSC	Within 2 weeks of receipt of hard copy results

4.0 FIELD SAMPLING ACTIVITIES

This section provides details regarding field sampling activities for the R. Lavin site. Specifically, the text discusses sampling rationales, locations, depth intervals, equipment, and procedures; sample handling procedures; and laboratory analytical parameters associated with the proposed AST, retention ditch, slage stock pile, baghouse, and process pumping station sampling at the R. Lavin site. All sampling locations will be selected by the U.S. EPA OSC and START on the day of the field investigation. Two START personnel will be present for the walkthrough and sampling activities.

All field activities will be conducted in accordance with this FSP and applicable Tetra Tech SOPs, which are included in Appendix A to this FSP. When the FSP differs from the SOPs, site-specific FSP procedures will be followed. Any deviations from the FSP will be approved by the U.S. EPA OSC.

4.1 AST SAMPLING

START will sample three ASTs located on site. Two of the tanks have a capacity of 350,000-gallons; the third has a capacity of 2-million gallons. All three tanks contain process water. The two 350,000-gallon ASTs have a layer of sludge on the bottom. START will collect water samples from the ASTs at different intervals using a Kemmer sampler or Bacon Bomb sampler. The water will be transferred to a clean wide-mouth plastic jar prepreserved with nitric acid (HNO_3). The amount of samples collected and the intervals at which they will be collected will be determined by the U.S. EPA and START before sampling begins. START will also collect sludge samples from the bottom of the two 350,000-gallon capacity ASTs on site. The sludge will be collected using an Eckman Bottom Dredge sampler or a Ponar sampler depending on the consistency of the sludge. The amount of samples collected will be

determined by the U.S. EPA and START before sampling begins. AST materials will be sampled in accordance with the sampling protocols documented in the SOPs presented in the Appendix A.

Specific task requirements are discussed below.

- All ASTs will be sampled using level D personal protective equipment (PPE) and air monitoring will be performed with a photoionization detector (PID) and combustible gas indicator (CGI).

AST samples will be submitted to a subcontracted laboratory for analyses. The AST water samples will be analyzed for total RCRA metals and the AST sludge samples will be analyzed for RCRA toxicity leaching characteristic procedure (TCLP) metals. Both AST water and sludge samples will also be analyzed for the additional metals: beryllium; boron; copper; nickel; and zinc. Any additional analysis will be determined in the field by the U.S. EPA OSC.

Photographs will be taken at all sampling locations. All disposable sampling equipment will be discarded and placed in trash bags that will be kept for future disposal as IDW. Non-disposable sampling equipment will be decontaminated after each sample is collected. Details on decontamination procedures is discussed in Section 5.0 of this FSP.

4.2 RETENTION DITCHES

START will collect samples from two retention ditches located on site. A surface water sample will be collected from each ditch. Using a gloved hand, a clean, wide-mouth plastic bottle prepreserved with HNO_3 will be placed at the surface of the water and water will be allowed to collect into the bottle. Once bottle is filled, it will slowly be removed from the water and capped. A sediment sample will also be collected from each retention ditch. To collect the sediment sample, a stainless steel spoon or trowel will be inserted into the surficial sediment layer. The trowel will be used to scrap the top layer of sediment and will slowly be removed from the water and placed into clean wide-mouth glass jars. In the event the water level is higher than expected, a clean wide-mouth glass jar tied to a string will be inserted into the surficial sediment layer and be allowed to settle. The jar will be pulled and sediment will collect in the jar. Once filled, the jar will slowly be removed from the water and capped. Retention ditch materials will be sampled in accordance with the sampling protocols documented in the SOPs presented in the Appendix A.

Specific task requirements are discussed below.

- Retention ditches will be sampled using level D PPE and air monitoring will be performed with a PID.

Retention ditch samples will be submitted to a subcontracted laboratory for analyses. The surface water samples will be analyzed for total RCRA metals. The sediment samples will be analyzed for RCRA TCLP metals. Both retention ditch surface water and sediment samples will also be analyzed for the following additional metals: beryllium; boron; copper; nickel; and zinc. Any additional analysis will be determined in the field by the U.S. EPA OSC.

manganese

Photographs will be taken at all sampling locations. All disposable sampling equipment will be discarded and placed in trash bags that will be kept for future disposal as IDW.

4.3 SLAGE SAMPLING

START will collect samples from two stock piles of slage located on site. A composite sample will be collected from each pile. Material will be collected from five different locations on the pile and placed into a dedicated, disposable pie pan. The material will be mixed thoroughly and placed into clean wide-mouth glass jars. Slage composite materials will be sampled in accordance with the sampling protocols documented in the SOPs presented in the Appendix A.

Specific task requirements are discussed below.

- Slage stock piles will be sampled using level D PPE and air monitoring will be performed with a PID.

Slage stock pile composite samples will be submitted to a subcontracted laboratory for analyses. The composite samples will be analyzed for total RCRA + TCLP metals. In addition, samples will also be analyzed for the following metals: beryllium; boron; copper; nickel; and zinc. Any additional analysis will be determined in the field by the U.S. EPA OSC.

manganese

Photographs will be taken at all sampling locations. All disposable sampling equipment will be discarded and placed in trash bags that will be kept for future disposal as IDW.

4.4 BAGHOUSE SAMPLING

START will attempt to collect samples from baghouses located on site if the material contained inside of the baghouse is easily accessible. A composite sample will be collected from the baghouse. Material will be collected from five different points in the baghouse and placed into a dedicated, disposable pie pan. The material will be mixed thoroughly and placed into clean wide-mouth glass jars. The amount of baghouses sampled will be determined by the U.S. EPA OSC and START before sampling begins. Baghouse composite materials will be sampled in accordance with the sampling protocols documented in the SOPs presented in the Appendix A.

Specific task requirements are discussed below.

- Baghouses will be sampled using level C PPE and air monitoring will be performed with a PID.

Baghouse composite samples will be submitted to a subcontracted laboratory for analyses. The composite samples will be analyzed for total RCRA + TCLP metals. In addition, samples will also be analyzed for the following metals: beryllium; boron; copper; nickel; and zinc. Any additional analysis will be determined in the field by the U.S. EPA OSC. manganese

Photographs will be taken at all sampling locations. All disposable sampling equipment will be discarded and placed in trash bags that will be kept for future disposal as IDW.

4.2 PROCESS PUMPING STATION

START will collect a water sample from a pit located in the process pumping station located on site. To collect the water sample, a clean wide-mouth plastic bottle prepreserved with HNO_3 tied to a string will be placed into the pit. Water will be allowed to collect into the bottle. Once the bottle is filled, it will slowly be removed from the pit and capped. Pumping station materials will be sampled in accordance with the sampling protocols documented in the SOPs presented in the Appendix A.

Specific task requirements are discussed below.

- The pumping station will be sampled using level C PPE and air monitoring will be performed with a PID.

Pumping station samples will be submitted to a subcontracted laboratory for analyses. The sample will be analyzed for total RCRA metals. In addition, samples will also be analyzed for the following metals: beryllium; boron; copper; nickel; and zinc. Any additional analysis will be determined in the field by the U.S. EPA OSC.

Photographs will be taken at all sampling locations. All disposable sampling equipment will be discarded and placed in trash bags that will be kept for future disposal as IDW.

5.0 DECONTAMINATION PROCEDURES

Sampling equipment will be decontaminated on plastic liners at each sampling location. Nondedicated sampling equipment will be decontaminated after each sample is collected. This decontamination may include disassembling the equipment and washing it with Alconox soap and water solution. In general, decontamination will consist of removing all visible evidence of contamination using a brush, washing the equipment with an Alconox soap and water solution, and applying three distilled water rinses. The decontaminated equipment will then be allowed to air-dry. Decontamination procedures are discussed in detail in Tetra Tech SOP No. 002 (see Appendix A). Disposable equipment such as plastic tubing, coveralls, gloves, and boot covers will be used wherever possible to minimize the possibility of cross-contamination.

6.0 DISPOSAL OF INVESTIGATION-DERIVED WASTE

START will segregate and store liquid and solid IDW during the field sampling effort. START does not anticipate collecting IDW samples during this sampling activity.

7.0 SAMPLE ANALYTICAL PARAMETERS

Section 4.0 indicated the analyses expected to be performed on the various matrices. Note that these analytical parameters may be altered in the field as conditions and the nature of the sample warrant. The following table summarizes the sample analytical parameters for the project along with the analytical methods and sample containers.

SUMMARY OF SAMPLE ANALYTICAL PARAMETERS, METHODS, AND CONTAINERS

Analyte	Analytical Method	Matrix	Sample Container	Preservation	Holding Time
Metals	SW-846 6010B and 7000 series	Soil, sediment, and waste	4-ounce, clear, wide-mouth jar	Cool to 4^0C	6 months (28 days for mercury)
		Surface and process water	1-liter polyurethane bottle	HNO_3 to pH<2 and cool to 4^0C	6 months (28 days for mercury)

Notes:

HNO_3 = Nitric acid
U.S. EPA = U.S. Environmental Protection Agency
SW-846 = Solid waste method

8.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

This section discusses QC samples, sample identification, QC of field activities, sample documentation and management, and data validation.

8.1 QUALITY CONTROL SAMPLES

Trip blanks are used to assess the potential for sample contamination during handling, shipment, and storage. Trip blanks are sample bottles filled with organic-free water. The trip blanks are sealed and transported to the field; kept with empty sample bottles and then with the investigative samples throughout the field effort; and returned to the laboratory for analysis with the investigative samples. Trip blanks are never opened in the field. One trip blank will be included in every shipping cooler of liquid samples.

Field blanks are samples of a matrix that is the same or similar to that of actual investigative samples. Field blanks are exposed to the sampling environment or equipment at the time of sampling. They are used to assess contamination resulting from ambient conditions. Field blanks are required for liquid matrices. For aqueous samples, field blanks will consist of deionized or demineralized water. Field

blanks are generally not required for solid matrices but may be collected on a case-by-case basis. One field blank will be collected for every 10 or fewer liquid investigative samples.

Equipment rinsate blanks are collected when sampling equipment is used to transfer samples into containers. These blanks are used to assess the cleanliness of the sampling equipment and the effectiveness of equipment decontamination. Equipment rinsate blanks are collected by pouring analyte-free water over the surfaces of sampling equipment that contact sample media. Equipment rinsate blanks are collected after sampling equipment has been decontaminated but before it is reused for sampling. Equipment rinsate blanks are typically collected at a frequency of one for every 10 or fewer liquid investigative samples. Equipment rinsate blanks are not usually required for solid matrices but will be collected at a frequency of one for every 10 or fewer investigative samples. Equipment rinsate blanks will not be collected for dedicated equipment used to collect samples.

A field duplicate sample is an independent sample collected as close as possible in space and time to the original investigative sample. Immediately following collection of the original sample, the field duplicate sample is collected using the same collection method. Care will be taken to collect the field duplicate sample as close to the original sampling location as possible. Field duplicate samples can be used to measure how sampling and other field procedures influence the precision of an environmental measurement. They can also provide information on the heterogeneity of the sample matrix at a sampling location. Field duplicates are collected at a frequency of one for every 10 investigative samples of the same matrix type.

Matrix spike and matrix spike duplicate (MS/MSD) samples are typically collected for analysis by organic methods. Solid and waste MS/MSD samples require no extra volume. Each liquid MS/MSD sample is a single sample, usually collected from a single location at triple the normal sample volume for VOC analysis and double the normal volume for extractable organic analysis. MS samples are typically collected for analysis by inorganic methods. Each MS sample is a single sample, usually collected from a single location at double the normal sample volume. In the laboratory, MS/MSD samples and MS samples are split and spiked with known amounts of analytes. Analytical results for MS/MSDs are used to measure the precision and accuracy of the laboratory organic analytical program; results for MSs are used to measure the accuracy of the inorganic analytical program. Each of these QC samples will be collected and analyzed at a frequency of one for every 20 investigative samples from a matrix.

8.2 SAMPLE IDENTIFICATION

Each sample will be identified using an alphanumeric system that identifies the project, sample type, and sampling location, and sampling depth (if applicable). The following designations will be used to identify sample types:

- "BLK" for a field blank sample
- "DUP" for a field duplicate sample
- "ER" for an equipment rinsate sample
- "TB" for a trip blank
- "S" for a soil or solid sample
- "SD" for a sediment sample
- "SW" for a surface water sample
- "TS" for an AST sludge sample
- "TW" for an AST water sample

Each predetermined sampling location will have a specific designation. Matrix spike/matrix spike duplicate samples will be identified in the field logbook and will be clearly designated on the chain-of-custody forms rather than in the sample identification numbers. Examples of sample identification numbers are listed below.

- S-03 Soil or solid sample from location 03
- TS-04 AST sludge sample from location 04
- SW-05 Surface water sample from location 05
- DUP-01 First field duplicate sample collected (duplicate location to be documented in field logbook)

8.3 QUALITY CONTROL OF FIELD ACTIVITIES

The START project manager will be responsible for ensuring that sample quality and integrity are maintained in accordance with Tetra Tech's QA Program Plan for START (Tetra Tech 2000) and that sample labeling and documentation are performed as described in Section 8.2 of this plan.

8.4 SAMPLE DOCUMENTATION AND MANAGEMENT

All sample documents will be completed legibly and in ink. Any document correction or revision will be made by lining through the original entry and initialing the change (see SOP 024 in Appendix A). Documentation procedures for the field logbook, sample labels, chain-of-custody records, and custody seals are described below. Samples will be shipped in accordance with Tetra Tech SOP 019 (see Appendix A).

Field Logbook: The field logbook details field activities and observations in an accurate and factual manner. The individual making logbook entries will sign each entry. Entries will include the following information:

- Site name and project number
- Names of personnel
- Dates and times of all entries
- Descriptions of all activities as well as off-site entry and exit times
- Noteworthy events and discussions
- Weather conditions
- Site observations
- Identification and descriptions of samples and sampling locations
- Dates and times of sample collection
- Records of photographs
- Site sketches
- Deviations from applicable U.S. EPA approved guidance or documents

Sample Label: A sample label will be attached to each sample container. The sample label will include the following information at a minimum:

- Sample identification number
- Sample collection date and time
- Name of sampler
- Sample preservative
- Requested sample analyses

Chain-of-Custody Record: A chain-of-custody record will be maintained from the time of sample collection until the sample's final disposition. Every transfer of sample custody will be noted and signed for on the record, and a copy of the record will be kept by each individual who has signed it. The chain-of-custody record will include the following information at a minimum:

- Sample identification number
- Sampling location
- Sample collection date
- Sample information
- Names and signatures of samplers
- Signatures of all individuals who have had custody of the sample

Custody Seals: Custody seals will be used on each shipping container to confirm that samples have not been disturbed. The individual who has custody of the samples will sign and date the seals and affix them to the shipping container so that the container cannot be opened without breaking the seals.

8.5 DATA VALIDATION

START will perform data validation of the sample analytical results in accordance with U.S. EPA's "Contract Laboratory Program National Functional Guidelines for Organic Data Review" (U.S. EPA 1999c) and "Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (U.S. EPA 1994).

9.0 REPORTING REQUIREMENTS

Validated sample analytical results and other information gathered will be summarized in a site assessment report. The site assessment report will be submitted to the U.S. EPA OSC upon completion.

REFERENCES

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APPENDIX A

TETRA TECH EM INC. STANDARD OPERATING PROCEDURES

(90 Sheets)

- No. 001 Site Reconnaissance and Characterization
- No. 002 General Equipment Decontamination
- No. 006 Sludge and Sediment Sampling
- No. 007 Bulk Materials Sampling
- No. 008 Containerized Liquid, Sludge, and Slurry Sampling
- No. 009 Surface Water Sampling
- No. 019 Packaging and Shipping Samples
- No. 024 Recording of Notes in Field Logbook
- No. 073 Air Quality Monitoring